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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/790,792	03/03/2004	Sang-cheol Ko	102-1019	4382
38209	7590	06/14/2007		
STANZIONE & KIM, LLP 919 18TH STREET, N.W. SUITE 440 WASHINGTON, DC 20006			EXAMINER ELVE, MARIA ALEXANDRA	
			ART UNIT 1725	PAPER NUMBER
			MAIL DATE 06/14/2007	DELIVERY MODE PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

<p align="center">Office Action Summary</p>	<p>Application No.</p> <p align="center">10/790,792</p>	<p>Applicant(s)</p> <p align="center">KO ET AL.</p>	
	<p>Examiner</p> <p align="center">M. Alexandra Elve</p>	<p>Art Unit</p> <p align="center">1725</p>	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 27 March 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,2,4 and 6-27 is/are pending in the application.
- 4a) Of the above claim(s) 23-27 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,2,4 and 6-22 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 03 March 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

Newly submitted claims 23-27 are directed to an invention that is independent or distinct from the invention originally claimed for the following reasons: new claims are directed towards etching a first surface that is different than the heating unit location and the separation of a plurality of ink jet heads.

Since applicant has received an action on the merits for the originally presented invention, this invention has been constructively elected by original presentation for prosecution on the merits. Accordingly, claims 23-27 are withdrawn from consideration as being directed to a non-elected invention. See 37 CFR 1.142(b) and MPEP § 821.03.

Claim Rejections - 35 USC § 112

Claims 7 & 15 rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention, that is, "cleaning an organic material having flown onto the wafer".

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-2, 4, 6-7, 9 & 15-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Richerzhagen (USPN 5,902,499) in view of Yamamoto et al. (USPN 5,482,660), Merdan et al. (USPN 6,696,666) and Peng et al. (USPN 6,737,606).

Richerzhagen discloses a laser and liquid jet for material machining. The system has a processing module (housing) and the workpiece is cut using the laser-liquid jet device. Nd:YAG lasers may be used. Pressures range from about 10 bars to 1000 bars. Nozzles are sizes from 5 to 50um. A conical shape may be used for focusing.

Richerzhagen does not teach the presence of a wafer, or a stage or all types of lasers or the laser beam diameter.

Yamamoto et al. discloses the fabrication of an ink jet head. Side and top-down jets are taught. An excimer laser beam is irradiation on the discharge port face and the stage is moved with the substrate thereon. The substrate may be made of glass, quartz and ceramic.

It would have been obvious to one of ordinary skill in the art at the time of the invention to use a stage and a wafer, as taught by Yamamoto et al. in the Richerzhagen process because the stage enhance versatility during fabrication and the use of a wafer is merely a design choice.

Although the exact pressures and sizes are not taught they are closely approximating or overlapping. It is well settled that where patentability is predicated upon a change in a condition of prior art process, such as pressure or hole size, the

change must be at least "critical", that is, it must lead to a new and unexpected result. The applicant has the burden of providing such criticality. Note *In re Aller* et al. 105 USPQ 223.

Merdan et al. discloses the use of hybrid laser water jet system (laser micro-jet). Types of lasers suitable for use with this system are YAG lasers, IR lasers, CO2 lasers, diode lasers and any combination thereof. (col. 2, lines 28-39, 65-67; col. 5, lines 12-17, 30-36)

It would have been obvious to one of ordinary skill in the art at the time of the invention to use different types of lasers as taught by Merdan et al. because this is drawn to the same liquid jet guided laser.

Peng et al. discloses the use of laser beam liquid assembly for the dicing of wafers. The liquid stream has a diameter equal to the laser beam diameter, which is about 50 to 150 μm . (col. 2, lines 19-23, 53, 60-62; col. 7, lines 22-27)

It would have been obvious to one of ordinary skill in the art at the time of the invention to note the diameter as taught by Peng et al. because these parameters are based on the same liquid jet guided laser.

Claims 8 & 10-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Richerzhagen, Yamamoto et al., Merdan et al. and Peng et al., as stated in the above paragraph and further in view of Hashimoto et al. (USPAP 2004/0246292).

Richerzhagen does not teach dicing of a wafer.

Hashimoto et al. discloses separation of a silicon wafer in the manufacturing of an ink jet head. It would have been obvious to one of ordinary skill in the art at the time of the invention to dice a wafer, as taught by Hashimoto et al. in the Richerzhagen system because it is merely a specific type of laser and liquid jet material machining.

Response to Arguments

Applicant's arguments filed 3/27/07 have been fully considered but they are not persuasive.

Applicant argues that Richerzhagen does not disclose an ink jet print head. The examiner respectfully notes that Richerzhagen teaches the use of a liquid jet guided laser for machining, while Yamamoto et al. teaches the fabrication of an ink jet head. In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

Applicant argues that Yamamoto et al. teaches only the use of an excimer laser and not the liquid jet guided laser. The examiner respectfully notes that Richerzhagen teaches the use of a liquid jet guided laser for machining, while Yamamoto et al. teaches the fabrication of an ink jet head using a laser. In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of

references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

In response to applicant's argument that the examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971).

Applicant argues that Merdan et al. is not analogous art and hence is not applicable. The examiner respectfully disagrees because Merdan et al. discloses the use of a hybrid laser water jet system (laser micro-jet) to cut holes in a stent which is much the same as cutting holes for an ink jet. Furthermore, Merdan et al. was used to show that there are many types of lasers suitable for use with this liquid jet system for cutting holes.

In response to applicant's argument that Merdan et al. is nonanalogous art, it has been held that a prior art reference must either be in the field of applicant's endeavor or, if not, then be reasonably pertinent to the particular problem with which the applicant was concerned, in order to be relied upon as a basis for rejection of the claimed invention. See *In re Oetiker*, 977 F.2d 1443, 24 USPQ2d 1443 (Fed. Cir. 1992). In this

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case, Merdan et al. discloses the use of a hybrid laser water jet system (laser micro-jet) to cut holes in a stent which is much the same as cutting holes for an ink jet.

Applicant argues that Peng et al. does not teach an ink jet. The examiner respectfully notes that Peng et al. was used to teach the diameter of the liquid stream through which a laser beam travels prior to machining. In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

Applicant argues that Hashimoto et al. does not teach the limitations of the ink jet fabrication and hence is not applicable art. the examiner respectfully disagrees because Hashimoto et al. was used to teach the dicing of a silicon wafer. In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

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A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to M. Alexandra Elve whose telephone number is 571-272-1173. The examiner can normally be reached on 6:30-3:00 Monday to Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jonathan Johnson can be reached on 571-272-1177. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

June 10, 2007.



M. Alexandra Elve
Primary Examiner 1725